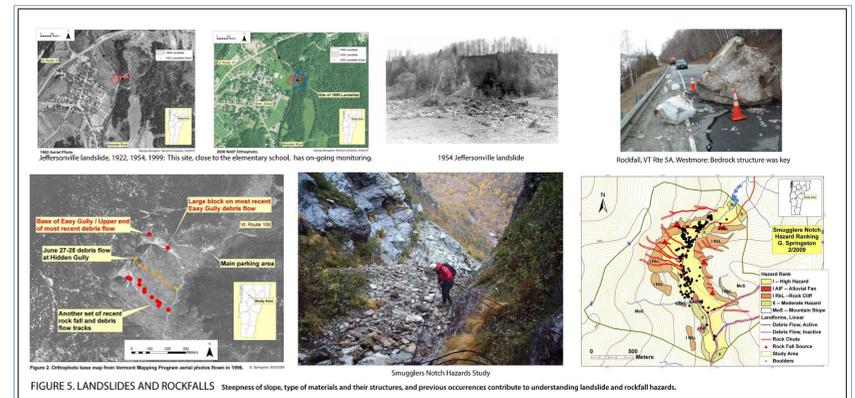
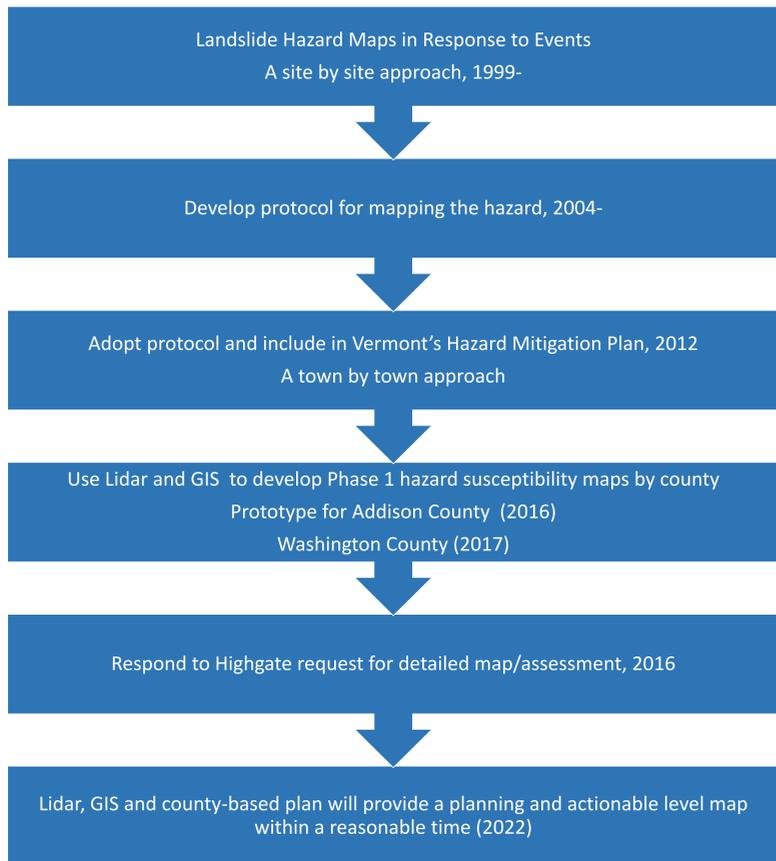


GIS AND LIDAR* APPLIED TO THE ASSESSMENT AND MITIGATION OF LANDSLIDE HAZARDS IN VERMONT

Vermont Geological Survey (VT DEC) in partnership with Norwich University, Green Mountain College and Central Vermont RPC

Landslide Mapping Progression



Landslides occur throughout the State and pose risks to human safety and property, water quality and the environment.

The VGS responds to 1-5 sites per year. The sites include rockfalls in high traffic areas such as Montpelier and Smugglers Notch, to erosion of roads, to landslides both above and below precariously placed buildings, and unstable slopes along rivers. Traditional mapping can address site specific hazards but requires considerable time.

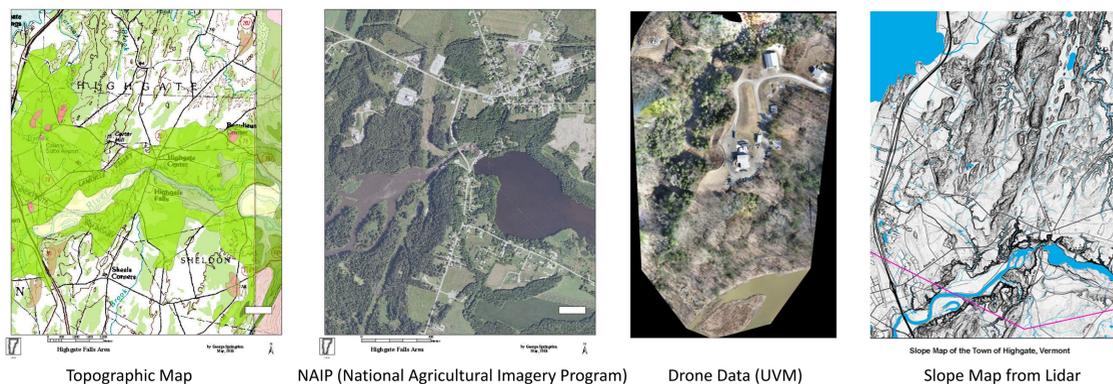
SOLUTIONS: Complete Phase One assessments to help all Vermont towns understand their susceptibility and plan for hazard avoidance or mitigation. We also plan to compile known sites and crowd-source a landslide hazard map to facilitate locating landslides in Vermont.

*GIS – Geographic Information System
Lidar – Light Detection and Ranging remote sensing method

Bare-earth LIDAR and GIS are the significant tools which allow the hazard analysis to progress more rapidly on a county-wide/statewide basis.

Phase 1 maps on a county-wide basis allows us to:

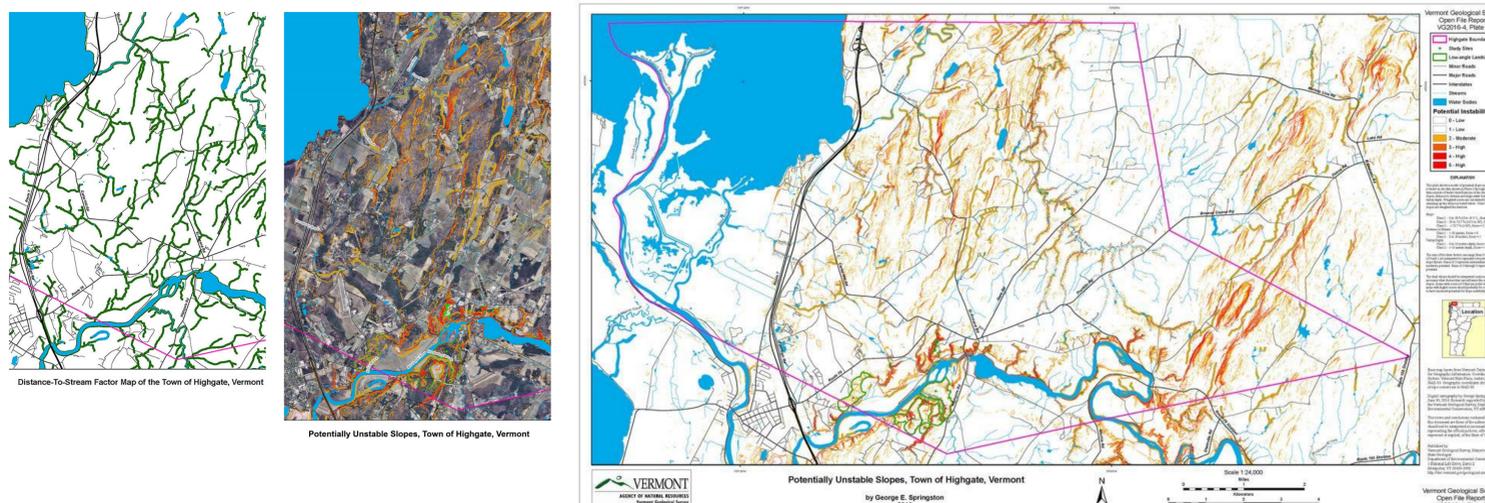
- 1) identify existing and historic hazard sites for the entire State within a reasonable time frame,
- 2) develop priorities for more detailed work, and
- 3) rapidly incorporate landslide data in a town planning process.



Phase 1:

- 1) select area of interest
- 2) assemble data layers, including Lidar & high resolution NAIP imagery in GIS
- 3) develop model
- 4) interpret orthophotos
- 5) conduct field reconnaissance
- 6) produce map to guide planning - buffers for infrastructure, areas of higher susceptibility, areas in need of mitigation and funding for stabilization

Some causes of landslides: Saturation of soil, Stream erosion causing over-steepening of banks, Reduction in strength of materials due to physical and chemical weathering, Addition of excess load onto slopes, usually from human activity, Earthquakes or artificial vibration



Factors leading to slope failures include:

- Slope steepness
- Existing landslide sites
- Wetness index
- Roughness
- Distance to streams
- Hydrologic group
- Soil type